

ABSTRACT OF THE DISCLOSURE

An along-track alignment and formatting system (ATAFS) formats synthetic aperture radar (SAR) data to align and format signals from scatterers in a scene to achieve an ideal data format in the along-track dimension in which such
5 ideal data format leads to improved image quality of an image based on the SAR data and/or reduced computational burden for generating an image based on the SAR data. Two aspects of the ATAFS include: 1) the division of data stabilization into two distinct steps; and 2) the along-track (or slow-time) migration of signal support of scatterers as a function of their along-track location. A suite of SAR
10 image formation algorithms use the ATAFS in conjunction with conventional signal processing stages to transform input coherent signal data into a complex image with image quality and geometric accuracy commensurate with the inherent information content of the input data.